CLAIM LISTING:

This listing of claims will replace all prior versions, and listings of claims in the application:

IN THE CLAIMS:

1. (Original) A method for operating a system having a population of designs, each design being adaptable for use in operating the system, the method comprising:

in response to an input signal, for each design in the population, generating an associated result signal;

determining a consensus result as a function of at least two of the generated result signals;

determining an associated fitness level of each design as a function of the associated result signal and the consensus result;

evolving a new design from at least one design in the population;

selecting for replacement at least one design as a function of the associated fitness level; and

replacing the design selected for replacement with the new design.

2. (Original) The method of claim 1, further comprising weighting one of the at least two generated result signals for use in determining the consensus result.

3. (Currently Amended) The method of claim 2, wherein weighting one of the at least two generated result signals for use in determining the consensus result includes weighting the result signal as a function of the associated fitness level determined in a prior generation.

4. (Currently Amended) The method of claim 3, wherein weighting the result signal as a function of the associated fitness level determined in a prior generation includes weighting the result signal as a function of a number of generations in which the associated design has been a member of the population.

5.   (Original)   The method of claim 1, wherein determining a consensus result as a function of at least two of the generated result signals includes accumulating result signals from each of the designs over a period of time and determining a consensus result from the accumulated result signals.

6.   (Original)   The method of claim 1, wherein determining a consensus result as a function of at least two of the generated result signals includes determining a statistical result of the at least two of the generated result signals.

7.   (Original)   The method of claim 1, further comprising outputting the consensus result for use in operating the system.

8.   (Original)   The method of claim 1, further comprising selecting at least one of the designs as a function of the consensus result and the associated result signal to generate an output for use in operating the system.

9.   (Original)   The method of claim 1, wherein determining an associated fitness level of each design includes comparing the associated result signal of each design with the consensus result.

10.   (Currently Amended)   The method of claim 9, wherein determining an associated fitness level of each design includes determining the associated fitness level as a function of first and second differences, the first difference being a difference between the associated result signal of the design and the consensus result, relative to the second difference being a difference between the associated result signals of the other designs and the consensus result.

11.   (Original)   The method of claim 10, wherein determining the associated fitness level as a function of the difference between the associated result signal of the design and the consensus result comprises determining a bitwise difference between the associated result signal of the design and the consensus result.

12. (Original)   The method of claim 10, wherein selecting for replacement at least one design comprises selecting a design having the greatest difference between the associated result signal of the design and the consensus result.

13. (Currently Amended)   The method of claim 1, wherein selecting for replacement the at least one design includes selecting the at least one design as ~~is~~ a function of a ~~relationship~~ degree of agreement between the associated result signal of the at least one design and the consensus result.

14. (Original)   The method of claim 1, wherein selecting for replacement the at least one design comprises randomly selecting at least one design.

15. (Currently Amended)   The method of claim 14, wherein randomly selecting at least one design comprises using the associated fitness level as a bias to increase ~~biasing~~ a probability of selecting each design ~~as a function of the associated fitness level~~.

16. (Currently Amended)   The method of claim 1 wherein evaluating the fitness of each design includes weighting the fitness of each design as a function of at least one of: the number of generations in which the design has been a member of the population, a ~~relationship~~ degree of agreement between the associated result signal of the design and the consensus result, and a probability function.

17. (Original)   The method of claim 1, prior to generating an associated result signal, further comprising:

evolving a preliminary population of designs by determining an associated fitness level of each design in the preliminary population as a function of fixed evaluation criteria; and

in response to satisfaction of selected completion criteria, ceasing evolving the preliminary population of designs and storing the preliminary population of designs as said population of designs from which the associated result signals are generated.

18. (Original)   The method of claim 1, wherein each of the steps of the method are performed subsequent to an occurrence of at least one of: reaching a selected time; reaching an end of a predetermined time interval; and a triggering event.

19. (Original)   The method of claim 18, wherein the triggering event is a failure of the system.

20. (Currently Amended)   The method of claim 1, wherein generating the associated result signal for each design in the population comprises:

programming a programmable device with a first design of the population of designs; and

reprogramming the programmable device with a second design of the population of designs; and

generating an associated result signal by generating an associated result signal using the second design.

21. (Currently Amended)   A method for evolving a population of hardware designs for operating an electronic hardware system, the method comprising:

in response to an input signal, generating associated result signals for each of a plurality of the hardware designs in the population;

determining a consensus result as a function of the associated result signals;

determining an associated fitness level of each of the population of hardware designs as a function of the associated result signal for each design and the consensus result;

selecting and replacing one of the hardware designs in the population with a new design as a function of the associated fitness level of the selected design.

22. (Currently Amended)   The method of claim 21, wherein determining a consensus result as a function of the associated result signals further includes determining the consensus result as a function of associated fitness characteristics of the plurality of <u>hardware</u> designs.

23. (Currently Amended)   The method of claim 22, wherein determining the consensus result as a function of associated fitness characteristics of the plurality of <u>hardware</u> designs includes assigning weight to each of the associated result signals as a function of the associated fitness characteristics of each <u>hardware</u> design.

24. (Currently Amended)   The method of claim 21, further comprising:

evolving a replacement design using at least two of the <u>hardware</u> designs in the population;

evaluating a fitness of the replacement <u>hardware</u> design as a function of the consensus result;

repeating the steps of evolving and evaluating until the replacement <u>hardware</u> design produces a result signal that is within a selected range of the consensus result; and

wherein selecting and replacing one of the <u>hardware</u> designs in the population with a new design includes replacing one of the <u>hardware</u> designs in the population with the replacement <u>hardware</u> design that produces the result signal that is within the selected range of the consensus result.

25. (Currently Amended)   A ~~fault-tolerant~~ system comprising:

a programmable device programmable with at least one of a plurality of designs, each design being adapted to generate an associated result signal in response to an input signal;

a fitness evaluator ~~configured and arranged~~ to determine a consensus result as a function of associated result signals from at least two of the plurality of designs and to determine an associated fitness level of each design of the plurality as a function of the associated result signals and the consensus result; and

a selector ~~configured and arranged~~ to select and replace one of the plurality of
designs with a new design as a function of the associated fitness level of the selected
design.

26. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, further comprising:
        an evolution controller ~~configured and arranged~~ to generate the new design
from a plurality of the designs.

27. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, wherein the fitness
evaluator ~~is further configured and arranged to select~~ <u>selects</u> at least one of the
plurality of designs for implementation in an operational device as a function of the
associated fitness levels of the plurality of designs.

28. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, wherein the fitness
evaluator ~~is configured and arranged to determine~~ <u>determines</u> an associated fitness
level of a design exhibiting a fault, the associated fitness level being indicative of the
fault, and wherein the selector ~~is configured and arranged to select and replace~~
<u>selects and replaces</u> the design exhibiting the fault as a function of said design's
associated fitness level.

29. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, further comprising:
        a program controller ~~configured and arranged~~ to sequentially program the
programmable device with one design at a time, the input signal being sequentially
applied to single designs to generate the associated result signals.

30. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, wherein the
programmable device includes a programmable logic device.

31. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, wherein the
programmable device includes a microprocessor.

32. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, wherein the programmable device includes at least one of the fitness evaluator and the selector.

33. (Currently Amended)   The ~~fault-tolerant~~ system of claim 25, further comprising a memory for storing at least one of the plurality of designs.